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## (54) TEACHING DEVICE FOR LANGUAGE

(57)Abstract:

PURPOSE: To provide the teaching device for languages which enables a learner to easily understand the grammatical error that he makes and to expect an excellent learning effect.

CONSTITUTION: The form of the error, the word and phrase which are the surface layer of the error and the method of correcting this error are recorded in an error information stack at every one word and phrase having the grammatical error in error detection processing. The correction processing to consult a dictionary for forming a corrected sentence in accordance with the information recorded in the error information stack and to substitute the word and phrase having the grammatical error with the correct word and phrase is executed in the error corrected sentence forming processing to be executed after the end of the above-mentioned recording (step 22). The correction sentence correcting the error in the input sentence is formed and the correction sentence is outputted to a display equipped in the system, etc., (step 24).
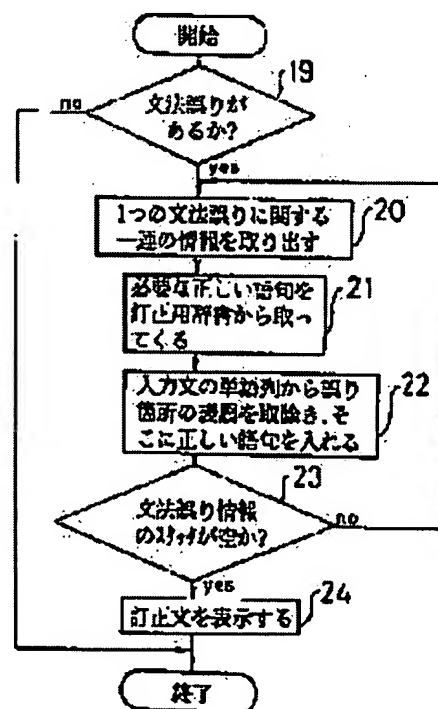
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DETAILED DESCRIPTION

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[Detailed Description of the Invention]
[0001]
[Industrial Application] Since in detail heightens the study effectiveness about the educational equipment for language studies to which linguistic study is carried out using a computing system, this invention corrects the grammatical error of the sentence which the student created, and it is related with the new educational equipment for language studies improved so that a right sentence might be generated and it might output.
[0002]
[Description of the Prior Art] The applicant for this patent etc. is developing what is shown in the following (1) and (2) as a technique of detecting a syntax error in the computing system which processes natural language.
[0003] (1) The technique of a Japanese Patent Application No. [ No. 045499 / 01 to ] publication.
[0004] (2) The technique of a Japanese Patent Application No. [ No. 168051 / 01 to ] publication.
[0005] Moreover, in case the input statement containing a derivative or the unsuitable vocabulary is analyzed, the thing of a publication is known by (3) JP,1-265359,A as a conventional technique of detecting the derivative in an input statement as a candidate, or correcting the unsuitable vocabulary.
[0006] The technique of (1) will recognize the part corresponding to the mistaken phrase structure rule as a phrase which has an error grammatically, if the mistaken phrase structure rule is used as a result of analyzing syntax by adding beforehand the phrase structure rule corresponding to the mistaken syntax into the phrase structure rule which is data for analyzing syntax. Moreover, in the case of this (1), for this patent, the technique of performing the error discovery program described by the phrase structure rule and the pair, and discovering a syntax error is also described, analyzing syntax.
[0007] In the technique of discovering this phrase of (1) that has an error grammatically, the processing which discovers information required to discover a syntax error and a syntax error is as following. First, each word in a dictionary is taken as the configuration which held a keyword, a part-of-speech name, and information required in case a syntax error is discovered. Moreover, about syntax, the processing which passes information more nearly required than the processing whose part to which the phrase structure rule is applied investigates grammatically whether it is the right in each phrase structure rule, and the part to which the phrase structure rule is applied when investigating the syntax error which is not investigated unless it is the node of a high order to the node at the time of being needed is described in the form of a program. And discovery of a syntax error is performed by performing processing described by the phrase structure rule as syntax, analyzing syntax.
[0008] The technique of (2) separates syntax-analysis processing and the processing which discovers a syntax error, and describes the processing which discovers a syntax error for each syntax error of every as a program which accesses an syntax-analysis tree and discovers a syntax error.
[0009] Without registering a derivative and the unsuitable vocabulary into a word dictionary, by the specific Ruhr, generation of a derivative and proofreading of the unsuitable vocabulary are performed, and the technique of (3) corrects a candidate word, and makes right sentential calculus possible. That is, in the case of (3), in the analysis of an input statement, it constitutes so that this affix word may be deleted from a candidate word, while detecting the affix word and auxiliary verb "****" in each candidate word extracted from the inside of an input statement, making it connect with other candidate words according to derivative generative grammar, generating a derivative and considering as a candidate word about the detected affix word. Moreover, when an auxiliary verb "****" is detected and the conjugated form of the candidate word which finishes with the alphabetic character in front of one of them is a conjugated form which connects an auxiliary verb "******", it constitutes so that what proofread the auxiliary verb "****" to "******" may be made into a candidate word.

[0010]    .

[Problem(s) to be Solved by the Invention] However, in both of cases of (1) mentioned above and (2), since it was unsolved about the point how to utilize it by subsequent study when it remained because the grammatical error in an input statement was only detected, and an error was detected, it was difficult [ it ] to make a student understand one's error and to heighten the study effectiveness.

[0011] Moreover, in the case of (3), detection of the candidate of a derivative and proofreading of the unsuitable error about the vocabulary, and indication are performed, but the thing beyond it does not carry out.

[0012] However, when making the conversation by natural language etc. learn interactively generally, the method of a right answer does not come out from a system only briefly to one question with which a student is provided in many cases, and even when inputting the answer which the student mistook grammatically to the question from a system, the gestalt of the grammatical error may be close to the grammatical structure (functor) of the sentence which a student creates, and may change delicately.

[0013] As in (3), therefore, extract and display only the part of the syntax error in a student's input statement, or or in correspondence of displaying the answer of the criterion currently beforehand prepared for the system side Even if it could make the student recognize that the error was in the input statement, it was not easy to relate the grammatical error which self risked with the functor which self adopted, and to make it understand, and an improvement of this point was desired.

[0014] It can make it understand easily what kind of grammatical error this invention risked for the student where of the sentence which he created, when it was made in view of said situation and a student risked a grammatical error, and aims at offering the educational equipment for language studies which can expect the outstanding study effectiveness.

[0015]

[Means for Solving the Problem] The error detection processing which detects the phrase in which the educational equipment for language studies concerning this invention has an error grammatically from a student's input statement, When the phrase which has an error grammatically by this error detection processing is detected, it is what performs error correction sentence generation processing which corrects a phrase with that error, and corrects and outputs a student's input statement to a right sentence grammatically. In order to perform said error correction sentence generation processing, it has a dictionary for correction sentence generation, and the error information stack which stores the information about the error in a student's input statement.

[0016] And said dictionary for correction sentence generation makes the configuration of having the refraction and the derivative list which described the change form in the predetermined array according to the class of phrase for every phrase used by study, in order to correct the phrase in a student's input statement which has an error grammatically.

[0017] Furthermore, in said error detection processing, the gestalt of the error, the phrase which is the surface of an error and serves as a keyword in the case of consultation-of-a-dictionary processing, and the array location within said refraction and derivative list with which the right gestalt is stored grammatically [ the phrase ] according to the gestalt of an error are recorded on said error information stack for every phrase which has an error grammatically.

[0018] Moreover, in said error correction sentence generation processing, based on the information recorded on said error information stack, correction processing which permutes the phrase of the error in a student's input statement by the right phrase grammatically is performed, the correction sentence which corrected the error in an input statement is generated, and it outputs to the display equipped with the correction sentence by the system.

[0019]

[Function] Since [ which corrected the phrase which has an error grammatically taking advantage of the student's expression when the phrase which has an error grammatically out of a student's input statement was detected ] a student can be grammatically notified as a right sentence, For example, he can understand easily what kind of grammatical error was risked for the student where of the sentence which he created rather than an error part is only pointed out in the grammatical vocabulary etc. And since the syntax error which he risked can also be known on real time, the outstanding study effectiveness is expectable.

[0020]

[Example] The flow chart of the error correction sentence-generation processing in one example of the educational equipment for language studies which drawing 1 requires for this invention, the explanatory view of the example of the dictionary [ in / in drawing 2 / said one example ] for correction sentence generation, the explanatory view of the informational example in_which of drawing 3 R> 3 is stored in the error information stack in said one example, drawing, in which drawing 4 shows the outline of the hardware configuration of said one example, drawing 5 , and drawing 6 are the explanatory views of the example of a dialogue at the time of the word English study in said one example.

[0021] The syntax-analysis processing which the educational equipment for language studies of one example of this invention is for English-conversation study, and analyzes the syntax of a student's input statement, The error detection processing which detects the phrase which has an error grammatically from a student's input statement, Correct the phrase which has that error when the phrase which has an error grammatically by this error detection processing is detected, and activation of the error correction sentence generation processing which corrects and outputs a student's input statement to a right sentence grammatically is enabled. In order to perform said error correction sentence generation processing, it has the dictionary for correction sentence generation, and the error information stack.

[0022] CPU1 which is the central processing unit which performs various kinds of above-mentioned processings in hardware as shown in drawing 4 , The main memory 2 which the program for the various processings which said CPU1 performs is loaded, or is used as a work area at the time of processing, It consists of a display 3 used for the display of the contents of study etc., a keyboard 4 used as a student's input means, a magnetic disk drive 5 which saves the data of the program and others for each above-mentioned processing.

[0023] From a magnetic disk 5, the syntax analyzer used for the above-mentioned syntax-analysis processing, the error detection program used for error detection processing, and the correction sentence generation program used for error correction sentence generation processing are loaded to main memory 2, and is performed. The data about the syntax used for the dictionaries (said dictionary for correction sentence generation is included) used at the time of study, and syntax analysis and discovery of a syntax error part are loaded to this main memory 2, when allowances are in main memory 2, but when the capacity of main memory 2 is insufficient, it is used while it had been stored in the magnetic disk drive 5 by it.

[0024] Hereafter, the description part of one example is explained in full detail.

[0025] Drawing 2 shows the configuration of said dictionary for correction sentence generation by the example. The keyword 6 which is the phrase used by study, the part-of-speech name 7 which shows the class of phrase, and refraction and a derivative list 8 are contained in this dictionary for correction sentence generation like illustration.

[0026] In order to correct the phrase in a student's input statement which has an error grammatically, refraction and the derivative list 8 The predetermined array according to the class (part of speech) of phrase (keyword) describes the change form for every phrase used by study, for example, if a keyword 6 is a verb The form where the verbal original form attached the 1st of the change form described in its refraction and derivative list 8, and s of 3 single ** attached the 2nd, and the 3rd become a past form, and the 4th becomes a past participle form, and if a keyword is a noun The first of the change form described in its refraction and derivative list 8 is the singular of the noun, and the 2nd is beforehand decided like the plural. Drawing 2 shows the configuration of the dictionary for correction sentence generation concretely about four keywords, "I", "want", "a", and "room."

[0027] In the case of this one example, the procedure to error discovery is the same as that of a thing given in JP,1-168051,A in which applicants for this patent did patent application previously. That is, also in this one example, as for syntax-analysis processing and error detection processing, it dissociates completely and said error detection processing detects the grammatical error in an input statement by accessing an syntax-analysis tree for each syntax error of every. However, when a grammatical error is detected, unlike the processing in the former, the error detection processing in this one example records the information about that grammatical error on said error information stack.

[0028] Drawing 3 shows the configuration of said error information stack by the example. When a grammatical error is detected by said error detection processing from a student's input statement, this error information stack is the part which stores the information about that grammatical error in said error detection processing, and is formed on said main memory 2 in hardware.

[0029] Information, such as the gestalt 13 of a syntax error which has an error grammatically and which the student risked for every word, the surface (namely, phrase which is a phrase which has an error grammatically and serves as a keyword in the case of consultation-of-a-dictionary processing) 14 of an error part, and the correction approach 15 of an error, is included in this error information stack. In addition, although the correction approach 15 of said error is mainly constituted from information on the array location within said refraction and derivative list 8 with which the right gestalt is stored grammatically [ the phrase ] according to the gestalt of an error, it may add the other grammatical contents of correction if needed (or [ it adds "have" ]). When two or more syntax errors are discovered in an input statement, an error information stack is loaded with each information on the above [ the discovered number ].

[0030] For example, a student When the sentence "I am there once." is inputted, as shown in the column 18 of drawing 3 In the gestalt 13 of a syntax error On the surface 14 of an error part which "is not a completion form" In "am" and the correction approach 15 of an error It is put into the information of "4 (semantics of taking the 4th thing among the change forms of a publication on refraction and the derivative list 8) of a have+ derivative list."

[0031] And termination of said error detection processing makes a series of processings shown in drawing 1 by said

error correction sentence generation processing. Like illustration, this error correction sentence generation processing investigates an error information stack first, judges whether the grammatical error is contained in a student's input statement (step 19), and if the grammatical error is not contained, it finishes processing. On the other hand, when the grammatical error is contained, a series of information about one syntax error is taken out from said error information stack (step 20). (namely, when information is recorded on the error information stack)

[0032] Subsequently, said dictionary for correction sentence generation ( drawing 2 ) is consulted by making the phrase of description into a keyword at the surface 14 of the error part in the taken-out information, the phrase of the array location specified by the correction approach 15 of said error from refraction and the derivative list 8 is taken, and the right phrase replaced with an error part is generated based on description of the correction approach 15 of an error (step 21).

[0033] And next, the completely same part as the surface 14 of an error part is removed from the word train of an input statement, and the right phrase generated at step 21 there is put in (step 22). If this step 22 is completed, it will investigate whether an error information stack is investigated again and there is any other information on a syntax error, and when an error information stack is not empty, the above-mentioned steps 20, 21, and 22 are repeated (step 23) and an error information stack becomes empty, the correction sentence which corrected all the grammatical errors on an input statement is displayed on a display 3, and processing is finished (step 24).

[0034] The above error correction sentence generation processing is applicable to dialogue study. Drawing 5 is an example in the case of performing dialogue control of restating correctly the utterance sentence (input statement) mistaken grammatically [ a student ], and countering it. In this case, if said error detection processing detects a syntax error to a student's utterance sentence 28 to the utterance sentence 27 from a system Correction sentence in which said error correction sentence generation processing corrected the error "I want two rooms" is generated. At the utterance sentence 29 from the following system, it is rooms"? (do you want to call it "I want two rooms"?). You mean"I want two The contents "are displayed on a display.

[0035] Drawing 6 is an example of a dialogue at the time of being made to perform control of performing only the display of the sentence which corrected a student's syntax error, and not affecting the flow of a dialogue. If a grammatical error is discovered from the student to the utterance sentence 38, a system will display the generated correction sentence 40 as a KR message 36. When it does in this way, the flow of a dialogue itself can advance study, without changing.

[0036] When the phrase which has an error grammatically out of a student's input statement with the educational equipment for language studies like **** is detected, the student's expression is harnessed. Since [ which corrected the phrase which has an error grammatically ] a student can be grammatically notified as a right sentence, For example, he can understand easily what kind of grammatical error was risked for the student where of the sentence which he created rather than an error part is only pointed out in the grammatical vocabulary etc. And since the syntax error which he risked can also be known on real time, the outstanding study effectiveness is expectable.

[0037] In addition, although the one above-mentioned example was about the case where English-conversation study is carried out, it is not limited to this one example and the study field for which this invention is used effectively can be used for other various linguistic study, education, etc.

[0038]

[Effect of the Invention] With the educational equipment for language studies concerning this invention, so that clearly from the above explanation Since [ which corrected the phrase which has an error grammatically taking advantage of the student's expression when the phrase which has an error grammatically out of a student's input statement was detected ] a student can be grammatically notified as a right sentence, For example, he can understand easily what kind of grammatical error was risked for the student where of the sentence which he created rather than an error part is only pointed out in the grammatical vocabulary etc. And since the syntax error which he risked can also be known on real time, the outstanding study effectiveness is expectable.

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[Translation done.]